

## CLAIMS

What is claimed is:

1. A method of forming a composite membrane for separating organic solvents, comprising:

providing a polymer and a substrate;

dissolving said polymer to form a first coating solution;

performing a membrane fabrication process to coat said first coating solution on said substrate to form a first composite membrane;

providing a second coating solution comprising a chitosan, a nano-inorganic particle and an organic acid;

coating said second coating solution on said first composite membrane to form a second composite membrane; and

performing a fixation process to neutralize said second composite membrane and to form a composite membrane for separating organic solvents.

2. The method according to claim 1, wherein said membrane fabrication process comprises:

coating said first coating solution with specific thickness on said substrate;

performing a phase transformation process to transform said first coating solution into solid structure with specific porosity and specific thickness, so as to form said first composite membrane; and

removing the solution from said first composite membrane.

3. The method according to claim 2, wherein said phase

transformation process comprises a polymer non-solvent according to said polymer to solidify said first coating solution.

4. The method according to claim 1, wherein said fixation comprises:

neutralizing said second composite membrane by an alkaline solution and a by-product of neutralization is formed;

removing said by-product of neutralization from said second composite membrane by a cleaning agent; and

removing said cleaning agent from said second composite membrane to form said composite membrane for separating organic solvents.

5. The method according to claim 1, wherein said membrane fabrication process comprises:

coating said first coating solution with specific thickness on said substrate;

performing a phase transformation process to transform said first coating solution into solid structure with specific porosity and specific thickness, so as to form said first composite membrane;

performing at least one replacement process to replace the solution of said first composite membrane by at least one organic solution; and

removing the organic solution from said first composite membrane.

6. The method according to claim 5, wherein said phase transformation process comprises a polymer non-solvent according to

said polymer to solidify said first coating solution.

7. The method according to claim 5, wherein the species of the organic solvent of every replacement process is the same.

8. The method according to claim 7, wherein the concentration of said organic solvents is proportional to the number of said replacement process.

9. The method according to claim 5, wherein the species of the organic solvents of every replacement process is different.

10. The method according to claim 9, wherein the contact angle of the organic solvents of every said replacement process increases with the increasing number of said replacement process.

11. The method according to claim 1, wherein said polymer comprises a polymer having a nitrile group (  $-C\equiv N$  )...

12. The method according to claim 11, wherein said membrane fabrication process comprises:

coating said first coating solution with specific thickness on said substrate;

performing a phase transformation process to transform said first coating solution into solid structure with specific porosity and specific thickness, so as to form said first composite membrane;.

performing a surface modification process to modify the functional group on said first composite membrane;

removing the surface modifying solution from said first composite membrane by a cleaning agent; and

removing said cleaning agent from said first composite membrane.

13. The method according to claim 12, wherein said phase transformation process comprises a polymer non-solvent according to said polymer to solidify said first coating solution.

14. The method according to claim 12, wherein said surface modification process comprises an alkaline solution with concentration greater than 0.25 N.

15. The method according to claim 14, wherein said alkaline solution further comprises a sodium hydroxide solution.

16. A structure of a composite membrane for separating organic solvents, comprising:

a carrier layer;

a support layer, wherein said support layer has a first surface and a second surface, and said support layer connects to a surface of said carrier layer with said first surface thereof; and

a separation layer, wherein said separation layer formed on said second surface of said support layer comprises a nano-inorganic particle and a chitosan.

17. The structure according to claim 17, wherein said carrier layer comprises a non-woven.

18. The structure according to claim 17, wherein the material of said support layer comprises a polysulfone.

19. The structure according to claim 17, wherein the material of said support layer comprises a polyacrylonitrile.